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WITNESS my hand this
Eleventh day of April 2005

JANENE PEISKER
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PROVISIONAL SPECIFICATION

Invention Title: GROWTH MEDIUM

Applicant: CASETECH AUSTRALIA PTY LTD
(ABN 47 105 826 471)

The invention is described in the following statement:

GROWTH MEDIUM

Field of Invention

This invention relates to improved horticultural growth mediums. In particular, the invention relates to improved horticultural growth mediums that include coconut derived vegetative material, specifically coir.

Background of the Invention

In the horticultural industry it is well known to use individual containers for the promotion of seed germination and the subsequent seedling propagation. In general seeds may be germinated either in individual containers or subdivided trays in which there are a number of seeds used. In these applications the individual containers or trays typically contain a mixture of earth, peat, vermiculite or other potting material and the seeds are germinated under controlled greenhouse conditions for quick initial growth. Once germination has occurred seedlings are then typically transplanted to large containers or into the field for further growth.

Growth media are therefore widely used in a number of horticultural applications. Accordingly, in the horticultural industry it is common practice to prepare artificial growth medium to be used in this way. Growth media are either prepared *in situ* by large users of the media or are prepared by specialist companies who sell their products in both the wholesale and retail markets. There are a number of properties that are desirable in mixes of this type. For example the growth medium should have desirable air porosity, suitable water retention properties and sufficient nutrients to sustain plant growth. In addition the product must be easy to use from a logistical standpoint. In other words the amount of additional handling required should be minimised where possible. As would be clear it is not always easy to balance these competing requirements,

however developmental work aimed at providing improved growth media is being constantly carried out.

A number of commercial growth medium have been developed keeping these criteria in mind. A typical commercial potting mix includes a mixture of coarse sand and an organic material. Mixtures of this type are quite commonly deficient in many nutrients necessary for plant growth and accordingly it is typical to add nutrients required for plant growth to a growth media of this type.

Historically growth media have typically contained materials derived from nature. For example, ingredients that are used extensively in horticultural growth medium are peat moss which in a preferred form is found as sphagnum peat or waste bark products from the forestry industry. Sphagnum peat is partially decomposed sphagnum moss and is obtained from a number of sources principally Ireland, Holland and Canada. This product is very desirable due to its water retention properties and the like. A problem with peat-based growth media of these types is that peat is a finite resource as it is effectively mined from peat bogs. Accordingly, it is a non-renewable resource and replacements for peat need to be developed.

One material that has found application as a possible replacement for peat is coir dust. Coir is a name given to the fibrous material that constitutes the thick mesocarpal middle layer of the coconut (*cocos nucifera*). The long fibres of coir are extracted from the coconut husk and utilised in the manufacture of brushes, automobile seats, mattress stuffing, drainage pipe filters, twine and other products. Traditionally the short fibres (2mm or less) and the dust (0-2mm) left behind after the longer fibres have been extracted have not found any industrial application. Recently, however it has been found that due to the high porosity of the mesocarpal layer of the coconut the coir dust and short fibres have a

correspondingly high porosity. As such they possess many of the properties of peat and can be used as a peat replacer. As coir is a renewable, environmentally friendly resource this makes it attractive as a possible peat replacer. Accordingly a number of horticultural growth medium utilising coir products have been developed. For example one commercially available horticultural medium is 25% coir, 30% compost bark fines, 30% compost horticultural bark, and 15% washed coarse sand with added fertilizer.

A common feature of the commercially available growth media containing coir is that the level of coir is quite low typically being less than 50%. This is because coir dust tends to agglomerate making it a poor growth media on its own as the air porosity of coir dust is quite low as it is very fine and tends to agglomerate.

In order to overcome this problem the present formulations containing coir typically require addition of a large number of additional ingredients to provide the final product performance. Whilst overcoming the agglomeration (and subsequent poor overall porosity) the addition of extra ingredients tends to lower the water retention of the mix when compared to pure coir. As such, in order to overcome the problems identified with the use of pure coir, it was necessary to add further ingredients that partially compromise at least some of the properties of the blend. In addition it makes the manufacturing procedure more cumbersome and environmentally unfriendly. Finally, many of the current formulations are quite bulky and difficult to handle. Thus, even those formulations that achieve high levels of coir were typically bulky and difficult to handle from a logistical standpoint. For example these products are typically expensive to freight and require significant shelf space when on retail display.

Having researched the issue, the applicant found that some of the difficulties identified with the use of coir was due to the fact that the coir typically used in growth media was coir dust with the small particle sizes discussed previously. It is thought that the use of coir with small particle size (such as coir dust having a particle size of 0-2mm) leads to problems as these materials are typically materials that densely pack leading to reductions in the air porosity of the blend. In order to overcome this difficulty, most users of coir in growth media have blended the coir with the desirable properties with other organic materials to bulk out the coir dust. The difficulty with this approach is it compromises the performance characteristics of the final blend as many of these bulking additives do not add any desirable characteristics to the final blend and are only added to overcome difficulties with the use coir dust.

Accordingly there is a need to develop further improved horticultural growth medium based on coir.

Summary of Invention

The applicant has carried out extensive studies on coir based growth medium. The applicant found that the majority of problems were caused by having coir dust as the coir ingredient in growth media of this type. This is necessitated blending of the coir with other ingredients to provide a horticultural growth medium with the desired properties.

The applicant has found that an improved horticultural growth medium could be achieved by blending coir of different size grades. This was found to provide a commercial product with suitable levels of air permeability but with improved water retaining capability due to the fact that the total amount of coir in the composition could be significantly raised in comparison to the existing growth media.

Accordingly in a first aspect the present invention provides a growth medium including fine grade coir, and coir having a particle size of at least 3mm. It is found the blend of these fine grade coir with a coir of a larger particle size provide a growth medium with improved characteristics. In particular, this growth medium has improved soil moisture retention as opposed to standard growth media that contain coir but with similar air porosity.

The amount of fine grade coir in the growth media can vary from between 5-40% of the total amount of coir in the composition, more preferably 10-20%, most about preferably 15%.

The coir having a particle size of at least 3mm can be provided by a single grade coir or may be provided in the form of a combination of coir grades. The amount of coir having a particle size of at least 3mm is preferably 60% to 95% of the total amount of coir in the composition, more preferably 80% to 95% of the total amount of coir in the composition, most preferably about 85%.

The coir having a particle size of at least 3mm is preferably a mixture of 3-6mm coir and chip and fibre coir.

The composition may contain varied amounts of 3-6mm grade coir. The composition preferably contains from 20-50% of the total amount of coir as 3-6mm grade coir, more preferably 30-40% 3-6mm grade coir, most preferably 35% 3-6mm grade coir.

The composition can also contain varied amounts of chip and fibre coir. The amount of chip and fibre coir can vary between 20% and 75% of the total amount of coir in the composition, preferably from 40-60%, most preferably 50%.

The amount of coir as a percentage of the growth medium can also vary. It is preferred that the total amount of coir in the composition is at least 50% of the

composition, more preferably at least 70%, even more preferably at least 90%, even more preferably at least 95%, most preferably at least 97.5%.

The growth media can of course contain a number of other additional components that are typically added to growth media of this type. For example the growth media can include at least one component selected from wetting agents, trace elements, fertilizers, fungicides, herbicides, insecticides, pigments, pH adjustment agents and the like. It is particularly preferred that the media contains a fertilizer, more preferably a slow release fertilizer or a controlled release fertilizer or a combination thereof, in order to add nutrients to the media. It is also preferred that the media contain a source of magnesium and calcium such as dolomite or lime.

Accordingly a preferred growth medium of the present invention includes:

(a) 10-30 parts of fine grade coir,

20-50 parts 3-6mm grade coir,

20-75 parts chip and fibre coir,

wherein the total sum of the parts of fine grade coir, 3-6mm grade coir, and chip and fibre coir add up to 100,

(b) a fertilizer,

(c) a magnesium and calcium source.

The growth media has preferably been dried. As such it preferably has a moisture content of less than 25%, more preferably less than 18%. It has been found that moisture levels of this type are preferable as they enable the media to be compressed. As such the growth media is preferably in the form of a compressed block wherein the composition has been compressed by at least a factor of 3, preferably by a factor of 5. The compressed block has significant advantages from a logistical standpoint as it is easy to use and handle and does

not require further processing (such as the addition of further additives) prior to use as a growth medium. In addition, when in the block form the media can be transported in a more cost effective manner thus significantly reducing overall cost to the consumer.

Detailed Description of the Invention

Coir is the name given to the fibrous material that constitutes the thick mesocarpal middle layer of the coconut fruit (*cocos nucifera*). The long fibres of coir are extracted from the coconut husk and utilised for the manufacture of brushes, automobile seats, mattress stuffing, drainage pipe filters, twine and other products. Traditionally the short fibres 2mm or less and dust left behind have accumulated as a waste product for which no industrial use had been discovered. This material due to its resemblance to peat is therefore known as cocopeat.

There are, however, a number of grades of coir available for different applications. Coir dust or cocopeat typically consists of short fibres of 2mm or less which contains 2-13% of the total and coir like particles ranging in size from granules to fine dust. Coir dust strongly absorbs liquids and gases to impart the honeycomb structure of the mesocarp tissue which gives the dust a high surface area to unit of volume. The material is also hydrophilic leading to high moisture capacity.

Coir dust and coir fibres are available in a number of grades. Fine grade coir typically has particles in the size of 0-3mm and incorporates coir dust as well as some larger particles. Superfine grade coir particles are particles of the size of 0-1mm range. There is also a 3-6mm grade of coir and, coir may also be available as chip and fibre coir in which the particles are bigger than 6mm. All of these are readily available commercially.

The applicant has carried out extensive studies on coir based growth medium. The applicant found that the majority of problems were caused by having coir dust as the coir ingredient in growth media of this type. This is necessitated blending of the coir with other ingredients to provide a horticultural growth medium with the desired properties.

The applicant has found that an improved horticultural growth medium could be achieved by blending coir of different size grades. This was found to provide a commercial product with suitable levels of air permeability but with improved water retaining capability due to the fact that the total amount of coir in the composition could be significantly raised in comparison to the existing growth media.

Accordingly in a first aspect the present invention provides a growth medium including fine grade coir, and coir having a particle size of at least 3mm. It is found the blend of fine grade coir with a coir of a larger particle size provide a growth medium with improved characteristics. In particular, this growth medium has improved soil moisture retention as opposed to standard growth media that contain coir but with similar air porosity.

The amount of fine grade coir in the growth media can vary from between 5-30% of the coir in the composition, more preferably 10-20%, most preferably 15%.

The coir having a particle size of at least 3mm can be provided by a single grade coir or may be provided in the form of a combination of coir grades. The amount of coir having a particle size of at least 3mm is preferably 70% to 95% of the total amount of coir in the composition, more preferably 80% to 95% of the total amount of coir in the composition, most preferably about 85%.

The coir having a particle size of at least 3mm is preferably a mixture of 3-6mm coir and chip and fibre coir.

The composition may contain varied amounts of 3-6mm grade coir. The composition preferably contains from 20-50% of the total amount of coir as 3-6mm grade coir, more preferably 30-40% 3-6mm grade coir, most preferably 35% 3-6mm grade coir.

The composition can also contain varied amounts of chip and fibre coir. The amount of chip and fibre coir can vary between 20% and 35% of the total amount of coir in the composition, preferably from 40-60%, most preferably 50%.

The growth media can of course contain a number of other additional components that are typically added to growth media of this type. For example the growth media can include at least one component selected from wetting agents, trace elements, fertilizers, fungicides, herbicides, insecticides, pigments, pH adjustment agents and the like. It is particularly preferred that the media contains a fertilizer, more preferably a slow release fertilizer, in order to add nutrients to the media. It is also preferred that the media contain a source of magnesium and calcium such as dolomite or lime.

Accordingly a preferred growth medium of the present invention includes:

(a) 10-30 parts of fine grade coir,

20-50 parts 3-6mm grade coir,

20-75 parts of chip and fibre coir

wherein the total sum of the parts of fine grade coir, 3-6mm grade coir, and chip and fibre coir add up to 100,

(b) a fertilizer,

(c) a magnesium and calcium source.

The media may contain any of a number of additives such as fertilizers and trace elements. Any fertilizer well known in the art may be used, however it is preferred that the fertilizer be a slow release fertilizer or a controlled release fertilizer. Any number of well known fertilizers may be used. The amount of fertilizer to be used will vary depending on the desired final product. Nevertheless the typical amount of fertilizer added is in the range of 0.1% to 5%, more preferably 1% to 4%, most preferably about 3%.

The media may also preferably contain trace elements.

The media also preferably contains a source of magnesium and calcium. The source may be any suitable type but is preferably dolomite. The level is typically in the range 0.5% to 2%, more preferably 0.75% to 1.25%, most preferably about 1%.

The media is typically produced by combining all ingredients in a blender and mixing until a thorough mixed blend is provided. It is then preferred that the blend is dried so that it has a moisture content of less than 25%, more preferably less than 18%. The blend is then preferably compressed into a block. A typical compression reduces the volume of the blend by a factor of about preferably 3 times, more preferably about 5 times. The advantage of being in the form of a compressed block is that the final product is very easy to handle from a logistical standpoint and thus attractive to consumers and retailers. In addition as it contains all necessary ingredients for a growth medium no further processing steps are required prior to use.

The invention will now be demonstrated with reference to the following example.

Example 1

A growth medium was produced by blending 15% fine grade coir, 35% 3-6mm grade coir and 50% chip and fibre coir. This material was blended to produce a homogeneous mixture of the coir grades. To this was added a slow release fertilizer and a magnesium and calcium source. The magnesium and calcium source was dolomite and was added at a rate of 1 Kg. per 1000L (prior to compression) and the amount of slow release added fertilizer was 3 Kg. per 1000L . This material was then blended, compressed into the form of a block and packed for use.

Finally, it is to be understood that various alterations, modifications and/or additions may be introduced into the constructions and arrangements of parts previously described without departing from the spirit or ambit of the invention.

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